



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,428	04/15/2004	James F. Buller	50432-702	6497

7590 03/22/2005
McDermott, Will & Emery
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

VU, DAVID

ART UNIT PAPER NUMBER

2818

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/824,428

Applicant(s)

BULLER ET AL.

Examiner

DAVID VU

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-12 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-12 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/15/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 20 recites the limitations "the silicon oxide liner" and "the silicon nitride liner" in page 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Objections

2. Claim 16 is objected to because of the following informalities:

In claim 16, line 1, the phrase "comprising" should be changed to -- further comprising --.

Appropriate correction of these informalities is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Ngo et al. (US 6,521,529, herein after Ngo).

Regarding claims 10-12, Ngo, in related text (col. 4, lines 24-57 and col. 5, lines 47-51) and figures (figs. 2-4) disclose a method for fabricating a semiconductor device, comprising: forming a gate electrode 21 over a substrate 20 with a gate dielectric layer 22 therebetween; forming an oxide liner 23 by PECVD at a temperature of about 380-400°C on the side surfaces of the gate electrode 21 and the upper surface of the substrate 20; forming a nitride liner 24 by PECVD at a temperature of about 380-400°C on the oxide liner 23 and forming a sidewall spacer 40 on the nitride liner 24.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 16 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Ngo et al. (US 6,521,529) in view of Yu (US 6,506,650).

Ngo fails to disclose using the gate electrode as a mask form shallow source /drain. However, Yu teaches ion implantation to form shallow source /drain extensions 22 at a junction depth of about 100-250Å in the upper surface of the substrate 12, using the gate electrode 16 as a mask, before forming the composite liner (fig. 1 and col. 3, lines 19-20). It would have been obvious to one with ordinary skill in the art at the time of the invention to form shallow source /drain extensions, using the gate electrode as a mask as taught by Yu in the process of Ngo, in order to reduce adverse short channel effects (col. 4, lines 35-40).

5. Claims 16-18 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Ngo (US 6,521,529) in view of Yu (US 6,506,650) and further in view of Miles (US 6,235,597).

Regarding claims 16 and 17, Ngo fails to disclose ion implanting a P-type impurity using boron. However, Miles discloses ion implantation to form shallow source /drain extensions 10 by using p-type dopants such as boron in the upper surface of the substrate 1 (col. 3, lines 1-5 and figure 1). It would have been obvious to one with ordinary skill in the art at the time of the invention to form shallow source /drain extensions, using the ion implanting a P-type impurity as taught by Miles in the process of Ngo, depending on the desired device to be fabricated.

Regarding claim 18, Yu teaches ion implantation to form shallow source /drain extensions 22 at a junction depth of about 100-250Å in the upper surface of the substrate 12 (fig. 1 and col. 3, lines 19-20).

6. Claim 20 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Ngo (US 6,521,529) in view of Ramaswami (US 5,783,475).

Ngo fails to disclose the silicon oxide liner is about 10-50Å and the silicon nitride liner is about 50-200Å. However, Ramaswami discloses in figures. 3-5 an oxide liner 48 (col. 2; lines 38-43 and lines 53-55), having a thickness of about 50-200Å, on the side surfaces of the gate electrode 32 and the upper surface of the substrate 31; a nitride liner 36, having a thickness of about 25-750Å, on the oxide liner 48 (col. 3, lines 1-30). It would have been obvious to one with ordinary skill in the art at the time of the invention to use the oxide/nitride thickness as taught by Ramaswami in the process of Ngo. The oxide/nitride thickness does not define patentable over Ngo in view of Ramaswami since the oxide/nitride thickness is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art. The specific thickness does not provide any critical or unexpected results to the method of manufacturing a bipolar transistor device. Rather, it is merely an obvious selection of the thickness based on desired functional characteristics determinable by routine experimentation. In *Aller*, the court stated, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re *Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995).

Response to Arguments

7. Applicant's arguments filed 12/01/04 have been fully considered but they are not persuasive.

Applicant's arguments are regarding the newly incorporated limitations regarding the steps of forming an oxide liner by decoupled plasma deposition at a temperature no greater than about 400°C and forming a nitride liner also by decoupled plasma deposition at a temperature no greater than about 400°C on the oxide liner. These arguments necessitated the new grounds of rejection including Ngo et al. (US 6,521,529) (see above).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (571) 272-1798. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Vu

March 19, 2005.